Claims

What is claimed is:

1. A system for decreasing interference in a coded signal, comprising:

an interference selector configured for selecting the interference;

a matrix generator communicatively coupled to the interference selector and configured for generating a matrix from the selected said interference, wherein the matrix comprises a plurality of vectors; and

a processor configured for using the matrix to project the coded signal substantially orthogonal to the interference to decrease the interference,

wherein at least one of the vectors comprises a plurality of elements with each element representing a component of the interference.

2. The system of claim 1, wherein the interference comprises at least one of a co-channel interference and a cross-channel interference.

3. The system of claim 2, wherein the cross-channel interference comprises at least one of a pseudorandom number code and a Walsh code.

4. The system of claim 2, wherein the co-channel interference comprises at least one of a pseudo noise code and a Walsh code.

5. The system of claim 1, wherein the coded signal comprises at least one of a pseudorandom number code and a Walsh code.

6. The system of claim 1, wherein the coded signal comprises a Code Division Multiple Access signal.

7. The system of claim 1, wherein the system is operable with a receiver, the receiver configured for receiving an analog signal comprising the coded signal and the interference.

8. The system of claim 1, wherein the system further comprises a memory configured for storing the matrix.

9. The system of claim 1, wherein the processor is further configured for processing a digital signal comprising the coded signal and the interference.

10. The system of claim 1, wherein the processor is further configured to generate a projection operator from the matrix for projecting the coded signal.

11. The system of claim 10, wherein the projection operator comprises the form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is the matrix and S^T is a transpose of the matrix.

12. The system of claim 1, wherein the processor is further configured to generate a projection operator from the matrix for application to a reference signal, wherein the reference signal represents a code of the coded signal.

13. The system of claim 12, further comprising an applicator configured for applying the projection operator to the reference signal to project the reference signal.

14. The system of claim 12, further comprising a correlator.

15. The system of claim 1, further comprising an applicator configured for applying a projection operator to a received signal comprising the coded signal and an interfering signal.

16. A method of decreasing interference in a coded signal, comprising:

generating a first vector from the interference; and

using the first vector to project the coded signal substantially orthogonal to the interference to decrease the interference,

wherein the first vector comprises a plurality of elements with each element representing a component of the interference.

17. The method of claim 16, further comprising:
generating a second vector from the interference; and
forming the first and the second vectors into a matrix for decreasing the interference.

18. The method of claim 16, further comprising:
copying the matrix; and
storing a copy of the matrix in memory in response to copying.

19. The method of claim 16, further comprising transposing a copy of the matrix.

20. The method of claim 16, wherein using comprises generating a projection operator, wherein the projection operator comprises the form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is the matrix and S^T is a transpose of the matrix.

21. The method of claim 20, further comprising applying the projection operator to the coded signal to substantially remove the interference from the coded signal.

22. The method of claim 20, further comprising applying the projection operator to a reference signal representing a code of the coded signal.

23. The method of claim 22, further comprising correlating a component of a received signal.

24. A system for decreasing interference in a coded signal, comprising:
means for generating a first vector from the interference; and
means for using the first vector to project the coded signal substantially orthogonal to the interference to decrease the interference,

wherein the first vector comprises a plurality of elements with each element representing a component of the interference.

25. The system of claim 24, further comprising:

means for generating a second vector from the interference; and

means for forming the first and the second vectors into a matrix for decreasing the interference.

26. The system of claim 24, further comprising:

means for copying the matrix; and

means for storing a copy of the matrix in memory in response to copying.

27. The system of claim 24, further comprising means for transposing a copy of the matrix.

28. The system of claim 24, wherein the means for using the first vector comprises means for generating a projection operator, wherein the projection operator comprises the form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is the matrix and S^T is a transpose of the matrix.

29. The system of claim 28, further comprising means for applying the projection operator to the coded signal to substantially remove the interference from the coded signal.

30. The system of claim 28, further comprising means for applying the projection operator to a reference signal representing a code of the coded signal.

31. The system of claim 30, further comprising means for correlating a component of a received signal.

32. A method of decreasing interference in a received signal, comprising:

generating a matrix having at least one vector exclusively comprised of elements from an interfering signal;

generating a projection operator from the matrix; and

using the projection operator to substantially remove the interfering signal from the received signal.

33. The method of claim 32, wherein generating comprises:

operating on the matrix to generate the projection operator according to the form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is the matrix and S^T is a transpose of the matrix.

34. The method of claim 33, further comprising applying the projection operator to the received signal.

35. The method of claim 33, further comprising applying the projection operator to a reference signal representing a code of a selected coded signal.

36. The method of claim 35, further comprising correlating a component of a received signal.

37. A system for decreasing interference in a received signal, comprising:

a matrix generator configured for generating a matrix having at least one vector exclusively comprised of elements from an interfering signal; and

a processor configured for generating a projection operator from the matrix and configured for using the projection operator to substantially remove the interfering signal from the received signal.

38. The system of claim 37, wherein the processor is further configured for operating on the matrix to generate the projection operator according to the form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is the matrix and S^T is a transpose of the matrix.

39. The system of claim 38, further comprising an applicator configured for applying the projection operator to the received signal.

40. The system of claim 38, further comprising an applicator configured for applying the projection operator to a reference signal representing a code of a selected coded signal.

41. The system of claim 40, further comprising a correlator.